

ROYAL HOSPITAL FOR WOMEN

LOCAL OPERATING PROCEDURES

CLINICAL POLICIES, PROCEDURES & GUIDELINES MANUAL

Approved by

Quality & Patient Safety Committee

18/8/11

NICOLETONE (aEEG) BRAIN MONITOR APPLICATION

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

PURPOSE & SCOPE: To apply the Viasys NicoletOne aEEG monitor to the newborn for brain monitoring.

The following babies may be considered for aEEG monitoring:

- Any baby who is receiving whole body hypothermia (cooling) as per the *RHW NCC Moderate Whole Body Hypothermia Protocol for Moderate to Severe Neonatal Hypoxic-Ischaemic Encephalopathy (HIE) in infants ≥ 35 weeks gestation*
- Any baby with abnormal movements or severe apnoeas that raise the suspicion of seizure activity
- Any baby with a suspected encephalopathy such as markedly abnormal tone or responsiveness
- A muscle-relaxed (paralysed) baby (ie: on Pancuronium or Rocuronium) who is at risk of HIE or neurologic abnormality
- Any baby with a probable significant hypoxic/ischaemic event around birth

EQUIPMENT: NicoletOne machine and cables
6 EEG electrodes (gold)
Packet of Gauze
Sensor-positioning aid (Brainz brand) or tape measure
NUPREP Abrasive Gel
Conductive EEG paste (EC2)
"Mefix" Tape / "Surgifix" Tubular stretch bandage
Sucrose and 1mL syringe for dispensing
Micropore
Crepe Bandage
Note: All the above stored in EEG Transport Box on the NicoletOne

PROCEDURE		
	PROCESS	RATIONALE
1	Obtain verbal consent from parents.	To inform and reassure parents of the procedure.
2	Administer sucrose to the infant prior to commencement of the procedure.	To provide pain/discomfort relief to the infant.

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PROCEDURE		
	PROCESS	RATIONALE
3	<u>Starting the NicoletOne monitor</u> Plug electrical cord into mains power.	To provide electricity to start the machine.
4	Check: <ul style="list-style-type: none"> • 3 connections on right edge of screen are secure before switching on. • Amplifier Headbox is plugged into cable connected to screen. 	To ensure all connections are correctly applied.
5	Switch machine on (Switch is located at the bottom of screen next to power cord entry).	To start monitor.
6	Click <i>OK</i> on Log On Box (No password is required).	To Log into the monitor.
7	Double-click on <i>NicVue</i> Icon. (Patient database should now be on the screen.)	To access the database.
8	Click <i>NEW</i> (located at the upper Left corner of screen.)	To start a new entry.
9	Enter patient details for new patient: <ul style="list-style-type: none"> • For DOB ⇒ use DD/MM/YYYY • Click <i>Nicolet</i> icon (centre of screen display of Montage selections) • Select "<i>RHW aEEG protocol</i>" (in protocol box (F3, F4, P3, P4) – Even is on Right, Odd is on Left. • Impedance value is set at <10KΩ in threshold box and do not change. 	
	<u>Preparing the Infant for aEEG Electrode Application</u>	
10.	Clean the work surface with cleaning solution.	
11.	Open gauze pack. Lay out equipment. Mark location for electrode attachment on head with marker pen (See section on Identification of Location for aEEG Electrodes.)	
13.	Remove any visible dried blood on hair. Gently pat dry with gauze without washing off the marked location points. DO NOT use alcohol to clean skin area.	This will cause skin abrasions.

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PROCEDURE		
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14.	<u>Attaching EEG leads:</u> Feed all 6 electrode cables through 10cm length of Surgifix tubular bandage.	The Surgifix can be slid over the infant's head easily to secure the electrodes after attaching electrodes to head.
15	<u>Surface Electrode Application</u>	
	15.1 Part hair at sites that have been measured.	
	15.2 Rub sites with Nuprep Abrasive gel using 3 cotton wool buds from the pack.	To ensure electrodes adhere well to scalp.
	15.3 Wipe edges of prepped area of excess cream.	
	15.4 Put a blob of EC2 paste onto the electrode underside.	
	15.5 Apply Mefix square on top of gold Surface Electrode and apply to cleaned/abraded surface.	
16	15.6 Plug electrode cables into Reference and ground sockets on NicoletOne Amplifier box.	Picture 3 To check impedance of all electrodes individually while applying to infant.
17	Apply the other 4 gold electrodes in the locations as set out in Step 14 - 17, with leads pointing up towards the vertex of the head.	To monitor for adverse reaction/s.
18	Plug the 6 electrode cables into the sockets on NicoletOne Amplifier box in the following locations: LHS Frontal into F3 LHS Parietal into P3. RHS Frontal into F4, RHS Parietal into P4. Forehead into <i>Ground</i> Occipital into <i>Reference</i>	Electrode location indicators on screen should turn from Red to Green. Impedance difference between each pair should be less than 3kΩ i.e. F3-P3, F4-P4.
19	Click on <i>Impedance</i> icon on Toolbar (Top left of monitor screen). Check impedance is <10kΩ as you attach each electrode to patient. (Before checking impedance, <i>Ground</i> and <i>Reference</i> electrodes must be attached)	To ensure impedance is <10kΩ.
	Apply bandage around head and chin	
<p>NOTE: If impedance colour is red (impedance >10kΩ):</p> <ul style="list-style-type: none"> • Check electrode fixation on the electrode indicated by the montage. • If still >10: Repeat procedure from step 16 and reapply the electrode. 		

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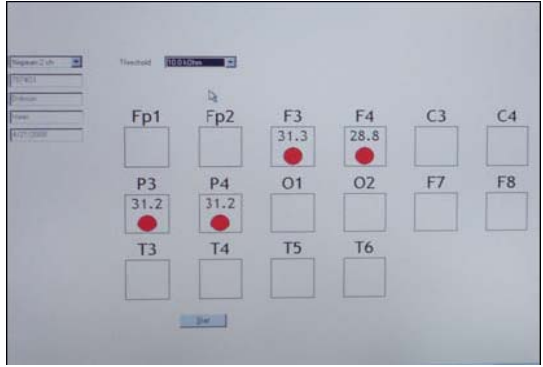
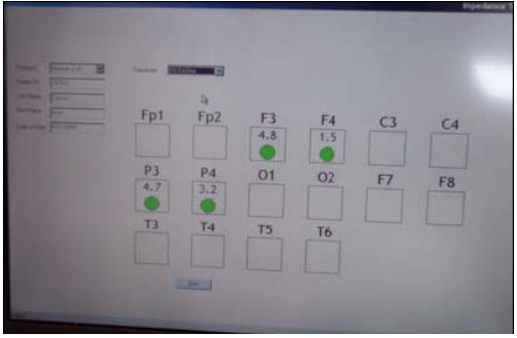
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PROCEDURE		
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20	<p>Slide Surgifix over infant's head to support electrode fixation (Picture 3)</p> 	 <p>Picture 4</p>
21	<p>To Re-Check the Contact Impedance (See Step 17):</p> <ul style="list-style-type: none"> • Each of the 6 lights indicates one of the 6 electrodes in the scalp. • All 6 lights should be green. • If impedance colour is Red (impedance >10kΩ) <ul style="list-style-type: none"> ○ Repeat procedure from Step 15 and reapply the electrodes. ○ If all lights are Red check Ref and Neutral fixation (See Picture 4). ○ If all lights are green commence monitoring – Step 22 (See Picture 4). <p>To Commence Monitoring</p>	 <p>Picture 5</p>
22	<p>Click Start button on screen below connection layout.</p>	
23	<p>Select "Notch" in Toolbar on top of screen. (This will filter unwanted noise from signal).</p>	<p>To activate monitoring on screen and start recording.</p>
<p>NOTE: Event boxes (RHS of lower EEG trace) can be selected to add event markers to recording.</p>		

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PROCEDURE		
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24	<p><u>To Ensure Accurate Recording</u></p> <p>If electrodes disconnect or impedance becomes >10kΩ</p> <p>24.1 a Bad Electrode Event Alert Box will appear on the monitor impedance screen.</p> <p>24.2 click <i>OK</i> and then select Impedance box on top of Toolbar of screen to check electrode indicators.</p> <p>24.3 follow instructions (see above) to improve contact if impedance for any lead is >10kΩ.</p> <p>24.4 click <i>START</i> box to recommence recording.</p> <p>24.5 Decrease electrical interference if possible. Turn off non-essential equipment (such as Radios and Mobile Phones) where possible.</p>	Electrically radiating equipment may cause interference to an EEG reading.
25	<p><u>To Shut Down</u></p> <p>25.1 Select "<i>File</i>" on top <i>Left</i> of Acquisition Screen and click on "<i>Exit</i>".</p> <p>25.2 Select "<i>OK</i>" to "<i>Do you want to close the ongoing test</i>".</p> <p>25.3 Select "<i>File</i>" on top <i>Left</i> of Database Screen and click on "<i>Exit</i>".</p> <p>25.4 Select "<i>Start</i>" at bottom <i>Left</i> of screen then select "<i>Shutdown</i>" in menu box.</p>	
26	<div style="border: 1px solid black; background-color: #e0e0e0; padding: 5px; margin-bottom: 10px;"> <p>NOTE: DO NOT remove power until Windows message on screen says it is safe to do so</p> </div> <p><u>Removal of electrodes</u></p> <ul style="list-style-type: none"> • Remove Mefix tapes. • Wipe electrode sites with gauze and warm water • Remove electrodes. • Do not discard electrodes. 	<p>To enable easy removal of electrodes.</p> <p>The electrodes are re-usable.</p>

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27	<p>Documentation</p> <ul style="list-style-type: none"> • Document observation chart the time aEEG is commenced on the infant • Record all seizure activity on Seizure Chart. • Mark all events on the patient recording using menu buttons on bottom Right of screen e.g. possible seizure, administration of anti-convulsant drugs, IV procedure, suctioning etc. 	
28	Notify medical staff of any abnormal rhythmic activity that is recorded on the monitor.	

References

RHW NCC Moderate Whole Body Hypothermia Protocol for Neonatal Hypoxic-Ischaemic Encephalopathy (HIE) in infants \geq 35 weeks gestation, November 2007.

The BRAINZ BRM2 Monitor: Its Application and Use in an Infant Patient, 2005.